January 20, 1998

EA 96-492

Mr. David Dawson
President
Transnuclear - West
6203 San Ignacio Avenue
Suite 100
San Jose, CA 95119

SUBJECT: NRC INSPECTION REPORT #72-1004/97-209

Dear Mr. Dawson:

On October 27 through November 6, 1997, the U.S. Nuclear Regulatory Commission performed a special team inspection at VECTRA Technologies, Incorporated (VECTRA) in San Jose, California. The inspection exit meeting was held on December 22, 1997 at NRC Headquarters in Rockville, Maryland.

On November 15, 1997, those VECTRA assets which were subject of this inspection, were purchased by Transnuclear, Incorporated (Transnuclear), and subsequently renamed as Transnuclear - West (TN-West). Despite the name change, this inspection will refer to the inspected organization as VECTRA .

The purpose of the inspection was to determine whether implementation of the corrective actions described in VECTRA's June 5, 1997, letter to the NRC were sufficiently complete to permit restart of cask system fabrication. The inspection focused on four major areas: Management Controls, Quality Assurance, Design and Configuration Control Programs, and Regulatory Compliance Programs. The inspection team noted that VECTRA has made significant progress in developing and implementing corrective actions in each of these areas. However, the team identified four significant concerns that must be resolved prior to resumption of any fabrication activities.

The first concern is the lack of a short-term continuous process to assess, nurture and reinforce VECTRA's new safety culture as activities progress towards a restart configuration. Although corporate objectives reflect management's commitment to the new safety culture, sufficient procedures and programs to continuously encourage employees to align with this new culture and to provide pertinent feedback on how well they align with this culture are not in place.

The second concern, which is related to the first one, is the failure to assess the effectiveness of training on safety culture improvement and human error reduction. While the subject training was provided to some staff, not all staff have received the same training and no formal mechanism is in place for determining whether the training was effective. This issue is important in that it demonstrates the level of commitment that VECTRA has towards supporting and maintaining a good safety culture.

The third concern is the ongoing design review of the Dry Shielded Canister (DSC) design. Although VECTRA staff has initiated a review of the calculations for the DSC, evaluation of recently identified issues was not complete at the time of the inspection. This is significant because the results of these evaluations may affect the licensing basis of the DSC.

The fourth concern is the uncertainty regarding the independence of the Quality Assurance organization from VECTRA line management. At the time of the inspection, the Quality Assurance manager also participated in making corporate decisions based on cost and schedular considerations. These collateral duties cause the QA Manager to act as part of the line organization.

Although a number of corrective actions were complete, the team concluded from the number of incomplete actions that VECTRA is not yet ready to resume fabrication activities. A summary of those corrective actions remaining open, including a designation of those items which must be completed prior to resumption of limited fabrication is included in the attached inspection report.

No nonconformances were identified during this inspection; however, a number of inspection follow up items and open item were noted and are discussed in detail in the attached report.

In response to this letter, notify us in writing when those items designated as required prior to resumption of limited fabrication are complete. Your response should also address your method for resolving the four concerns described in this letter and how you will support the safety culture observed during the inspection in the future. You should also discuss whether you believe VECTRA has implemented sufficient and effective corrective actions to warrant resumption of limited fabrication activities. In your response, please include a description of the associated analyses, procedures, training and any other measures employed in order to complete each item.

Should you have any questions, please contact Francis Young of my staff. Mr. Young may be reached at 301-415-3207.

In accordance with 10 CFR 2.790 of the NRC's "Rules of Practice," a copy of this letter, its enclosure, and your response will be placed in the NRC Public Document Room.

Sincerely,

Susan Frant Shankman
Acting Deputy Director
Spent Fuel Project Office

Docket Number: 72-1004

Enclosure:
NRC Inspection Report
72-1004/97-209

cc: A. Nelson, NEI
NUHOMS Owners' Group

D. Dawson

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U.S. NUCLEAR REGULATORY COMMISSION

SPENT FUEL PROJECT OFFICE
OFFICE OF NUCLEAR MATERIAL SAFETY AND SAFEGUARDS

Docket No.: 72-1004

Report No.: 72-1004/97-209

Certificate Holder: VECTRA, Technologies Inc.

Location: San Jose, California

Dates: October 27 - November 6, 1997

Inspectors: Susan Frant Shankman, Team Manager, Acting Deputy Director,
Spent Fuel Project Office (SFPO),
Office of Nuclear Material Safety and Safeguards (NMSS)
Francis Young, Team Leader, Senior Project Manager
Transportation and Storage Safety Section, SFPO, NMSS
Timothy Kobetz, Project Manager,
Spent Fuel Licensing Section, SFPO, NMSS
Thomas Matula, Safety Inspector,
Transportation and Storage Inspection Section, SFPO, NMSS
Ronald Parkhill, Senior Mechanical Engineer,
Spent Fuel Technical Review Section, SFPO, NMSS
Isabelle Schoenfeld, Human Factors Analyst
Office of Nuclear Regulatory Research

Approved by: Susan Frant Shankman, Acting Deputy Director,
Spent Fuel Project Office
Office of Nuclear Material Safety and Safeguards

Enclosure

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EXECUTIVE SUMMARY

VECTRA Technologies Inc.
NRC Inspection Report 72-1004/97-209

On January 13, 1997, the U.S. Nuclear Regulatory Commission (NRC) issued a Demand for Information (Demand) to VECTRA Technologies, Inc. (VECTRA), as the result of numerous NRC inspection findings involving problems with VECTRA's design control and quality assurance (QA) programs. On January 24, 1997, VECTRA voluntarily suspended Nutech Horizontal Modular Storage (NUHOMS) system fabrication activities because of concerns stated in the Demand and identified by an independent organization contracted by VECTRA to perform an overall assessment of its QA program and implementation of corporate goals and engineering activities. On April 10, 1997, VECTRA responded to the NRC regarding the Demand by providing the findings of the independent assessment including the recommended corrective actions.

On May 9, 1997, the NRC met with VECTRA to discuss VECTRA's response to the Demand and VECTRA's proposed corrective actions. At the meeting, VECTRA committed not to resume fabrication of the NUHOMS system components until the NRC conducted an inspection to assess the effectiveness of the corrective actions that VECTRA had implemented. On
June 5, 1997, VECTRA provided a written supplemental response to address questions raised by the staff at a meeting on May 9, 1997, and staff's written request for additional information identified during the staff's review of VECTRA's submittal of April 10, 1997.

On October 27 through November 6, 1997, the U.S. Nuclear Regulatory Commission performed a special team inspection at VECTRA Technologies, Incorporated (VECTRA) in San Jose, California. The inspection exit meeting was held on December 22, 1997 at NRC Headquarters in Rockville, Maryland.

On November 15, 1997, those VECTRA assets which were subject of this inspection, were purchased by Transnuclear, Incorporated (Transnuclear), and subsequently renamed as Transnuclear - West (TN-West). Despite the name change, this inspection will refer to the inspected organization as VECTRA .

The purpose of the inspection was to determine whether implementation of the corrective actions described in VECTRA's June 5, 1997 letter to the NRC were sufficiently complete to permit restart of cask system fabrication. The inspection focused on four major areas: Management Controls, Quality Assurance, Design and Configuration Control Programs, and Regulatory Compliance Programs.

The inspection team noted that VECTRA has made significant progress in developing and implementing the corrective actions identified in response to the Demand. The scope of the corrective actions appear sufficient to address those programmatic issues and concerns identified in the Demand and, when fully implemented should adequately resolve NRC's concerns as discussed in the Demand. Therefore, the inspectors concluded that NRC should

not issue Orders as discussed in Section III of the Demand. At the time of the inspection, VECTRA's progress was sufficient enough to permit inspection of the implementation of corrective actions in each of the four major areas.

However, during the inspection, the inspectors identified four significant concerns that must be resolved prior to resumption of any fabrication activities.

In particular, the team identified the following issues as areas of concern:

The first concern is the lack of a short-term continuous process to assess, develop and reinforce VECTRA's new safety culture as activities progress towards a restart configuration. In response to the Demand, VECTRA hired an external contractor to perform an independent common cause assessment of VECTRA's performance deficiencies. This independent assessment identified poor safety culture as a major contributor to identified problems.

The International Atomic Energy Agency defines a safety culture as an "assembly of characteristics and attitudes in organizations and individuals which establish that, as an overriding priority, safety issues receive the attention warranted by their significance." As such, safety culture is both attitudinal and structural in nature, and is demonstrated through management commitment to matching safety issues with appropriate procedures, programs and actions.

The inspectors found that although corporate objectives reflect management's programmatic commitment to nurturing a strong safety culture, sufficient procedures and programs are not in place to continuously cultivate and support the organization's safety culture. In addition, there was no mechanism to provide pertinent feedback to management on the status of the organization's safety culture. The inspectors noted that management expectations for ensuring that all activities are focused on supporting this safety culture have not been incorporated into those tools used to assess the performance of all levels of the organization, including individual work units or employees.

The second concern, which is related to the first one, is the failure to assess the effectiveness of training on safety culture improvement and human error reduction. While the training on safety culture was provided to some, not all staff have received the same training and a formal mechanism is not in place for determining the effectiveness of the training. The initial training was presented in a three day session; however subsequent make up sessions were only one day. It is not clear whether the shortened version of the training was as effective as the three day version. Again, VECTRA established the training program; however, training classes were inconsistent in length and no feedback mechanism was in place to ensure that all trainees obtain a consistent understanding of management expectations related to safety culture. This issue is important in that it demonstrates the level of commitment that VECTRA has towards supporting and maintaining a good safety culture.

The third concern is the ongoing design review of the Dry Shielded Canister (DSC) design. During VECTRA's recent reassessment of their design control process, concerns

were raised related to several DSC design parameters. Although VECTRA staff has initiated a review of the calculations for the DSC, evaluation of recently identified issues was not complete at the time of the inspection. This is significant because the results of these evaluations may affect the licensing basis of the DSC. This concern must be resolved before fabrication of any DSCs.

The fourth concern is the uncertainty regarding the independence of the Quality Assurance organization from VECTRA line management. At the time of the inspection, the Quality Assurance manager also participated in making corporate decisions based on cost and schedular considerations. As a result, the inspectors could not verify that VECTRA's Quality Assurance organization was sufficiently independent from the line organization. Independence of the QA organization must be established before resuming any fabrication activities.

Although some corrective actions were complete, the team concluded from the number of incomplete actions that VECTRA is not yet ready to resume fabrication activities. While these items are of lesser significance than the four issues noted above, the following actions will be evaluated prior to resuming any fabrication activities:

- Completion of the root cause procedure and subsequent training of affected staff

- Revision of the procedure governing corrective actions to clearly prohibit verbal approval to implement corrective actions

- Development of a milestone schedule for interim and long-term corrective actions

- Completion of the validation of fabrication checklists

- Completion of the position description for the Quality Assurance Manager.

Overall, the team concluded that VECTRA is not ready to resume either limited or full fabrication activities at this time. Once the corrective actions designated as being required prior to limited fabrication are complete, Transnuclear West, should notify NRC in writing of such completion of the open items. Following staff reviews of the actions taken by Transnuclear West, the staff will determine whether limited fabrication activities may proceed.

A description of those corrective actions remaining open, including a designation of those items which must be completed prior to resumption of limited fabrication is included in the attached inspection report.

REPORT DETAILS

1.0 BACKGROUND

On November 26, 1996, NRC held a public meeting with VECTRA Technologies, Inc. (VECTRA) to convey NRC's concerns about VECTRA's quality assurance (QA) program. At the meeting, NRC stated that VECTRA's poor understanding of the breadth of problems with its QA program was of significant regulatory concern. On January 13, 1997, the NRC issued a Demand for Information (Demand) to VECTRA as the result of numerous NRC inspection findings involving problems concerning the effectiveness of VECTRA's QA program. Therefore, the Demand was issued to seek information as to why the NRC should not suspend further VECTRA fabrication activities until VECTRA identified and effectively corrected the significant problems associated with the implementation of VECTRA's QA program.

On January 24, 1997, VECTRA voluntarily suspended its fabrication activities in response to the deficiencies identified by the NRC staff and NUHOMS customers concerning the company's management oversight and QA programs. VECTRA contracted an independent organization to conduct a programmatic assessment of its entire QA program, management oversight, and engineering activities. In addition, VECTRA's Spent Fuel Cask System Owners Group conducted an independent audit of the company's QA programs. Moreover, at a meeting with the NRC on May 9, 1997, VECTRA committed not to resume its fabrication of NUHOMS system components until the NRC determines that the company has implemented sufficient corrective actions.

From October 27 through November 6, 1997, the NRC conducted a team inspection at the VECTRA offices in San Jose, California, to assess the company's implementation of the corrective actions as outlined in VECTRA's submittal of June 5, 1997. The inspection assessed VECTRA's management oversight of its QA program and procedures.

On November 15, 1997, Transnuclear, Inc. (Transnuclear) purchased the assets owned by VECTRA, which were the subject of the inspection. On December 8,1997, the company name was changed from VECTRA to Transnuclear-West. For clarity, this report will refer to the company as VECTRA.

2.0 INSPECTION OBJECTIVES AND SCOPE

This inspection was performed to assess the effectiveness of corrective actions taken by VECTRA in response to the Demand. Specifically, the inspection focused on four programmatic areas: (1) management control; (2) QA program implementation; (3) design and configuration control; and (4) regulatory compliance. In assessing each of these areas, the team specifically evaluated the effectiveness of VECTRA's programs and procedures in controlling the design, fabrication, and testing of dry storage systems. In particular, the inspection team selected these areas because they were identified as a problem area in the Demand or as a root cause of the problem in VECTRA's response to the Demand. VECTRA's response to the Demand identified 44 corrective action items (CAIs). Each CAI that was being implemented was assessed in one of the related functional areas. CAIs 21, 26, 27 and 38 were not yet implemented and therefore were not assessed during this inspection.

To assess VECTRA's management control program, the team reviewed the company's mission statement and goals, staffing, line management organization authority and responsibilities, identification and correction of fabrication problems. In particular, the team focused on the organizational and management changes that VECTRA had implemented to correct past failures to comply with safety and regulatory requirements.

To assess the effectiveness of VECTRA's QA program, the team examined the company's audit program, as well as its fabrication controls and its procedures for testing and inspecting dry storage systems components.

To assess VECTRA's design and configuration control program, the team examined the company's controls over engineering design, design configuration, and documentation.

To assess VECTRA's regulatory compliance program, the team examined the company's root cause and common cause analysis programs, as well as its overall response to the Demand and adherence to regulatory requirements. The team also reviewed the adequacy of recent safety evaluations performed by VECTRA and the company's process for identification and information exchange with utilities regarding safety-related defects or failures of VECTRA's products.

3.0 MANAGEMENT CONTROL

a. Inspection Scope (36800)

The inspectors reviewed the following changes to VECTRA's management controls and revised processes and procedures implemented as part of VECTRA's corrective actions to the Demand:

- C VECTRA's independent common cause assessment (CCA) conducted by Performance Improvement International (PII)
- C The adequacy of PII's identification of root causes for the problems that led to the stoppage of fabrication
- C VECTRA's corrective actions to address the identified root causes
- C Activities associated with monitoring and verifying the effectiveness of VECTRA's corrective actions
- C The extent to which VECTRA has implemented its corrective actions

Management control, used in this context, includes the mission statements and goals of the organization, staffing, line management authority and responsibilities, and problem identification and resolution. Because VECTRA's independent CCA revealed that the company's "corporate culture" represented a significant root cause of the problems leading

to the ineffective implementation of the company's QA Program, the corporate culture was assessed as it related to the CAIs. International Atomic Energy Agency, International Nuclear Safety Advisory Group Report Number 4, dated 1991, used by the inspectors during the assessment define a safety culture as an "assembly of characteristics and attitudes in organizations and individuals which establish that, as an overriding priority, safety issues receive the attention warranted by their significance." Hence, safety culture is attitudinal as well as structural, relates both to organizations and individuals, and concerns the requirement to match all safety issues with appropriate perceptions and actions. The CAIs related to management control were items 3, 12, 14, 20, 23, 25, 28, 30, 31, 32, 33, 34, 36, 37, 39, and 42. The status of each CAIs is listed in Table 1.

The inspectors reviewed the CCA methodology; the safety culture index (SCI) and management quality index (MQI) survey methods, analyses, and results; administrative procedures; corrective action program descriptions; updated position descriptions; new organizational structure; and the PII training program descriptions and related memoranda to staff. The inspectors also conducted twenty interviews with VECTRA personnel at all levels of the organization, including the company's CEO and President, vendor personnel and PII trainers.

b. Observations and Findings

CAI 3 - Independent Common Cause Assessment of NRC Programmatic Concerns

VECTRA contracted with PII to perform the independent CCA. During that process, PII examined numerous documents discussing or describing various programmatic issues. Among others, these included the Demand, associated NRC inspection reports, customer audit reports, VECTRA's internal audits, non-conformance reports, and corrective action reports. PII also interviewed customer representatives and VECTRA employees. Using its failure mode assessment methodology, PII identified four major root causes of VECTRA's problems: (1) inadequate program management, (2) an inadequate corrective action program, (3) an inadequate management control loop and monitoring procedures, and (4) inadequate work oversight and control. As a result, PII developed recommended corrective actions and defined potential activities to monitor and verify the effectiveness of the recommended actions.

As the monitoring system for this CAI, PII used as assessment tool known as the periodic Safety Culture Index (SCI) survey. The purposes of the SCI were to: (1) determine the relative strengths and weaknesses based on the data collected to validate the results of the CCA, and (2) establish the baseline to monitor the progress of improvement in the safety culture. PII administered the SCI survey in May 1997. To achieve these proposes, the SCI uses two performance indicators known as the Culture Index (CI) and the Human Error Propensity Index (PI). Specifically, the CI "measures the strength of an organization's current culture that will dictate its future performance" in relation to five key characteristics of a safety culture. By contrast, the PI assesses human error drivers and barriers to assess the margin to failure of the fabrication process.

The SCI yielded a “score” for the company as a whole as well as individual scores for each of the four major departments, i.e., Engineering, Quality Assurance, Project Management, Licensing, for both the CI and the PI. When PII administered the SCI in May 1997, VECTRA’s organizational performance was below PII’s nuclear industry average benchmark for both of the indicators, when assessed in relation to the measures discussed above.

Administering the SCI periodically, as the CCA recommends, PII's intent is to compare those results with the baseline results to note any improvements or deteriorations. The NRC inspectors found, however, that there was no weighting of the safety significance for the SCI factors. Thus, introducing an SCI factor such as “routine staff meetings” could raise a future SCI score despite the fact that there is no improvement in more safety-significant factors such as “effectiveness of work processes to determine root causes and take corrective actions.” Hence, a higher score does not necessarily mean that the safety culture has improved for safety-significant factors. The inspectors also noted that the SCI is a periodic indicator of the safety culture. Therefore the SCI can not provide a continuous or short-term monitoring of the safety culture, which the inspectors concluded is needed since VECTRA's safety culture, established during a work stoppage period, has not yet matured. The inspectors also noted that the assessment of the SCI scores is based on data collected primarily from the nuclear utility industry. Hence, comparing the scores of a small, non-utility company to the nuclear industry benchmark may not be a valid measure of improvement.

By conducting the independent CCA of the NRC's programmatic concerns, VECTRA and PII have completed the corrective action for this CAI. However, the inspectors found that because of the limitations of the SCI, this assessment tool, by itself, is not sufficient to monitor the effectiveness of VECTRA's corrective action (See CAI 36).

CAI 12 - Assignment of a Program Manager to each Key Work Process

Memoranda to VECTRA personnel, dated April 18 and July 18, 1997, define Program Managers' responsibilities for evaluating specific work processes and Procedure Managers' responsibilities for implementing specific procedures. Specifically, VECTRA has assigned Program Managers to oversee key work processes related to Configuration Control, Corrective Actions, Licensing Commitment Control, and Project Management. The Program Managers monitor effectiveness, solicit input from end-users and incorporate enhancements to their work processes, as appropriate. The Procedure Managers, who report to Program Managers have also been identified and are responsible and accountable for one or more specific procedure. Procedure Managers are tasked with answering questions, collecting end-user feedback, and incorporating enhancements for their specific procedures, in coordination with the Program Managers. By memorandum, dated October 26, 1997, Project Managers and Procedure Managers were to ensure that changes to processes and procedures are made to incorporate lessons learned from both internal and external reviews during preparation for restart and actual restart of fabrication.

By assigning Program and Procedure Managers to each key work process, VECTRA has completed this CAI. The inspectors, noted, however that the Demand described a monitoring system that would audit the key work processes. VECTRA has not yet developed a program to monitor the effectiveness of the implementation of each key work process that ensures completeness and consistency in the activities of all work process managers. (Addressed as part of CAI 36.)

CAI 14 - Rescind Existing Signature Authority Delegation Lists

The QA manager rescinded delegation of signature authority for selected activities in a memorandum to selected QA personnel, dated April 11, 1997. In a memorandum, dated April 18, 1997, VECTRA's President promulgated new signature guidelines for delegation authority to all company managers and leads and also voided all previous signature delegations. This corrective action is completed.

CAI 20 - Employees Expectations for the Identification of Deviations, Errors, and Program Improvements

To assess the status of this CAI, the inspectors reviewed a variety of documents and interviewed VECTRA employees. This assessment confirmed that VECTRA management, through both meetings and written communications, had conveyed company's expectations about self-identification of issues to its employees. This included discussions on initiating non-conformance reports to document identified deviations, errors, and program improvements without recrimination. This corrective action is completed.

CAI 23 - Assignment of an Interim Senior Level QA Consultant to the QA/QC Staff

On May 12, 1997, VECTRA obtained the services of a PII employee to temporarily fill the position of the QA Manager. That interim QA Manager has held various senior-level QA management positions with nuclear utilities and Department of Energy over the last 20 years. This corrective action is completed.

CAI 25 - Effectiveness Review of Senior Management

In May 1997, PII conducted an assessment of VECTRA senior management. The assessment referred to as the Management Quality Index (MQI) survey evaluated managers' technical knowledge, management skills and aptitude. To do so, PII used a questionnaire to survey each manager’s staff, peer group, and supervisor, followed by an interview with the manager. The survey focused on developing an understanding of each manager's past behaviors under different situations, especially stressful conditions. The MQI survey was completed for the five senior VECTRA managers: the company President, the Licensing Manager, the Engineering VP, the Manager of Projects, and the former QA Manager.

The inspectors noted that the MQI survey provided information about how the people responding to the questionnaire survey perceive a given manager’s strengths and

weaknesses. Managers who were the subject of the MQI survey, were assessed for the 6 to 12 month period preceding May 1997 - a time of significant stress related to financial uncertainty, as well as external and internal pressures from many sources. Hence, the MQI survey did not fully assess managers' conduct and behavior under different situations. Further, most of the research supporting the MQI survey scores was derived from the nuclear utility environment, and was not modified for small or non-nuclear utility environments.

Subsequently, in interviewing VECTRA's staff, the inspectors noted that a number of the questions on the MQI survey did not relate to VECTRA's environment; nonetheless, PII asked employees to respond as well as they could. Hence, the respondents may have interpreted the questions differently and the responses/results may not be comparable to responses in the nuclear utility industry. The inspectors noted that, because of VECTRA's size, a relatively small number of staff report to a particular manager. As a result, VECTRA employees may have felt that their responses could easily be attributed to them. In addition, the survey results did not include any information regarding responses from other staff in departments who frequently interact with a given manager. As result, the inspectors found that the scores were very similar for most of the managers. This may reflect the company's culture at the time of the assessment and its influence on managers' effectiveness. In other words the company's practices and procedures may have impeded managers' ability to exercise their management skills.

In conducting the MQI to assess the effectiveness of senior management, VECTRA and PII completed this CAI. Nonetheless, the inspectors observed that the MQI had limitations for VECTRA and, by itself, did not adequately measure a manager's effectiveness.

CAI 28 - Issue Management Mission and Goals

The President of VECTRA re-issued the company's mission statement on June 10, 1997, and discussed the key factors for the company's success at an all-employees meeting on June 13, 1997. The mission statement was developed using input from every level of VECTRA's work force. The President also issued company-wide objectives. Departmental objectives supporting company-wide mission objectives are in various stages of development. Objectives for each individual will be developed following development of department objectives. In evaluating these activities, the inspectors found that personnel understand and support the mission statement. This corrective action is completed.

CAI 30 - Human Error Reduction Training for VECTRA and Selected Vendor Personnel

PII provided "Safety Culture Improvement" and "Human Error Reduction" training to VECTRA personnel and selected vendor representatives. The 3-day training was given during the weeks of April 28 and May 5, 1997. PII also provided a 1-day "makeup" session on June 2, 1997, for personnel who missed any part of the original 3-day training

session. A half-day “refresher” training sessions were given on June 3, July 16, and July 17, 1997. The training objective was to provide skills designed to significantly reduce human errors through error prevention, detection, and correction techniques. Subsequent interviews conducted by the NRC inspectors revealed that the participants believed that the material presented was useful, they understood the material, and the trainers were effective.

As of October 27, 1997, 12 of 27 employees still had not attended or had not completed this training. A VECTRA representative stated that these employees will receive the necessary training before the company resumes limited fabrication. The training for these individuals will be in the form of either reading assignments with question and answer sessions or classroom sessions. The inspectors concluded that VECTRA will need to determine whether this reduced training was effective. If the reduced training is found deficient, VECTRA should provide the full training to employees who were originally scheduled to receive it. This CAI remains open pending completion of the training before resuming limited fabrication (IFI 72-1004/97-209-01).

CAI 31 - Conduct Root Cause Training for Professional Staff

During the week of May 19, 1997, PII conducted a 4-day root cause training course designed to provide a comprehensive introduction to the PII's root cause and common cause analysis techniques. Specifically, these techniques comprise PII's methodology for detecting and correcting global and localized organizational and programmatic issues, as well as individual performance problems. Of those personnel who received the training, five individuals were designated as core root cause analysis personnel. PII mentored two of these trainees on the analysis techniques while conducting an actual root cause analysis. At the time of the inspection, these two people from this core group were considered ready to independently conduct a root cause analysis. The other three had not yet completed their mentoring sessions.

Subsequent interviews conducted by the NRC inspectors revealed that VECTRA personnel believed that the training contained a great deal of information and the trainers were effective. However, several interviewees stated that they would have benefited from a case-study approach to teach the root cause analysis techniques.

A memorandum dated October 27, 1997, from the QA Manager to the Department Managers indicates that eight people originally scheduled to receive root cause analysis training had not completed the training. This memorandum also stated that a sufficient number of individuals were trained to perform root cause analysis and no additional root cause training would be offered at this time. The inspectors noted that the Managers of Engineering and Projects had not completed the training. These managers serve as work process managers, and the Engineering manager also serves on the Corrective Action Review Committee. This root cause analysis training is intended to provide relevant knowledge to engage in appropriate review/oversight. This corrective action will remain open pending completion of training for these managers before resuming limited fabrication (IFI 72-1004/97-209-02).

CAIs 32, 33, and 34 - Establishment of Events Analysis Monitoring and Trending Programs, Root Cause and Common Cause Analysis Program and Process, and Tools to Monitor Effectiveness of Corrective Action Programs

At the time of this inspection, VECTRA was in the process of implementing events analysis monitoring and trending programs, root cause and common cause assessment programs. In addition, VECTRA was developing tools to monitor the effectiveness of its corrective actions. The events analysis monitoring and trending program will record all conditions adverse to quality (CAQ). The CAQs will be coded into several severity levels with the higher levels, e.g., significant conditions adverse to quality (SCAQs), requiring root cause analysis as well as action to prevent recurrence. Less significant events will require remedial actions and will be tracked and monitored to identify unwanted trends. A common cause analysis will be periodically performed on these less significant events. The program will include a tracking system to ensure timely resolution of all identified issues. The root cause and common cause analyses will evaluate equipment failures, human errors or inappropriate actions, and programmatic deficiencies. Corrective actions will be developed and the effectiveness of the actions will be monitored. Procedures will be issued for these new programs.

The inspectors noted that, VECTRA had initiated an event reporting system and issued a Corrective Action Process Flowchart on October 28, 1997. A draft “Guideline on Root Cause and Apparent Cause” was issued on October 27, 1997. The inspectors concluded that VECTRA needed to validate and modify the new procedures to reflect user feedback and, where appropriate, train affected personnel before actually implementing the final procedures. As result CAIs 32, 33 and 34 will remain open until VECTRA presents a milestone schedule and plan for their development and implementation, including periodic independent reviews of the process before full fabrication resumes (IFI 72-1004/97-209-03).

CAI 36 - Establish Objective Self-Assessment Program

At the time of this inspection, VECTRA had not yet established an objective self-assessment program for use in periodic reviews of key work processes. Such reviews are necessary to enable management to initiate needed modifications before significant problems develop. This CAI remains open until VECTRA presents a milestone schedule and plan for development and implementation of this program before resuming limited fabrication (IFI 72-1004/97-209-04).

CAI 37 - Identification of QA Program Responsibilities

According to VECTRA's response to the Demand, the company's management was to ensure that QA personnel are aware of their responsibilities for implementing the QA program requirements. Identification of QA program responsibilities for specific personnel also ensures that requirements are being addressed by establishing the appropriate level of accountability, responsibility, and authority. Besides the monitoring system described in the Demand, VECTRA has not developed organizational, functional and individual position descriptions to define the roles, responsibilities, accountabilities,

and authorities for its QA program. This corrective action remains open until VECTRA presents a milestone schedule and plan for its development and implementation before resuming full fabrication. (IFI 72-1004/97-209-05)

CAI 39 - Establish Program to Assess QA Personnel Effectiveness

VECTRA was to establish a program to define performance standards for QA/QC personnel. At the time of the inspection this had not been done. This corrective action remains open until VECTRA presents a milestone schedule and plan for its development and implementation before resuming full fabrication (IFI 72-1004/97-209-06).

CAI 42 - Fill Targeted VECTRA Staff Vacancies

VECTRA staffing has been increased to fill known vacancies. VECTRA, however, needs to identify resource needs based on required actions and composite project schedules prior to fabrication activities, especially for QA supplier oversight. This corrective action remains open until VECTRA provides a milestone schedule and plan for its development and implementation (IFI 72-1004/97-209-07).

c. Conclusions

VECTRA's independent common cause and root cause assessment found that a culture change was required to support an effective safety culture.

The inspectors noted evidence of a positive change in the safety culture, both organizationally and individually, through improved communications; specialized training; corrective actions; procedures, policies and processes and new attitudes. The inspectors further noted that VECTRA personnel understood the characteristics of the previous culture that led to the stoppage of fabrication and the characteristics of an effective safety culture.

VECTRA had defined long-term monitoring of its safety culture, primarily through the SCI survey and through trending of its root cause and common cause corrective action programs. The SCI is to be conducted "periodically" and data collection and trending requires sufficient data over time to conduct analyses. Hence, these are long term measures for monitoring the safety culture and for determining the effectiveness of new programs, processes and procedures. The inspectors found that VECTRA's "safety culture" is new, has been established during a stop work status, and therefore requires reinforcement and monitoring on a near term basis as well as over time to ensure continuance of the safety culture through limited and full fabrication. However, the inspectors found that the management control program was not well defined relative to establishing processes to reinforce and monitor the safety culture in the near term. The inspectors concluded that using only long term measures such as the SCI and trending and analysis would not clearly discern a shift in the safety culture in the near term.

The common cause analysis found that human error was a significant contributor to the deficiencies in QA program implementation. PII trained VECTRA personnel in safety

culture improvements and human error reduction; root cause and common cause analysis techniques; and field observation techniques. The original 3 to 4-day training had presented information about human error traps; prevention, detection, and correction techniques; root cause and common cause techniques; and field observation techniques. However, this training was reduced to one-day and then subsequently reduced further to reading assignments with questions and answers. No formal evaluation of the original and the reduced training nor of the trainees was conducted to assess whether the training was effective. The inspectors concluded that VECTRA needs to determine whether the reduced training was adequate. If the reduced training is found deficient, VECTRA should provide the original training to those employees who were originally scheduled to receive it. This training needs to be completed before the start of fabrication.

4.0 QUALITY ASSURANCE

a. Inspection Scope (35702)

The inspectors evaluated the implementation and effectiveness of VECTRA's QA program by verifying completion of certain corrective actions specified in VECTRA's response to the Demand. To do so, the inspectors reviewed procedures and other documents and interviewed VECTRA's management and staff to assess the adequacy of CAIs 5, 9, 13, 16, 17, 19, 29, 35, and 43. The inspectors also assessed portions of VECTRA's QA program to determine if, as implemented, they met the requirements of Title 10, Parts 71 and 72, of the *Code of Federal Regulations* (10 CFR Parts 71 and 72).

b. Observations and Findings

CAI 5 - Perform a Corrective Action Report Generic Impact and Corrective Action Reports

VECTRA's engineering staff reviewed the corrective action reports (CARs) issued in 1995 and 1996 to verify that they had been correctly evaluated and dispositioned. This review also evaluated the CARs for their: (1) generic impact on other projects; (2) consistency of technical conclusions with license commitments; (3) consideration of technical ramifications; (4) adequacy of root cause analysis; and (5) specification and completion of corrective actions.

The engineering staff then issued Report No. CAR 97.007-01, "Corrective Action Report Review," Revision 0, dated May 5, 1997, to communicate the results of its review.

VECTRA's QA staff then performed an audit of CAR No. 97.007-01, and documented the findings in Audit Report No. IPA.0031, "DFI Task No. 5 - CAR Generic Impact and Corrective Action Review," dated July 10, 1997. VECTRA subsequently took corrective action to resolve the findings identified in IPA.0031, and QA verified the actions taken. On May 5, 1997, VECTRA issued Report No. CAR 97.007-01, Revision 1, to provide the revised results of the CAR review. In the report VECTRA concluded:

> The CAR responses submitted contained a high percentage of deficiencies based on [VECTRA's] current standards. The review of CARs validates the concerns identified in the NRC inspection and customer audits relative to generic review of issues (69 percent deficient) and root cause analysis (54 percent deficient).

VECTRA then issued a total of 73 action requests (ARs) to identify actions necessary to resolve the issues resulting from review of the 29 CARs issued in 1995 and 1996.

The inspectors reviewed a sample of CARs issued in 1995 and 1996, along with the associated documentation. From that sample, the inspectors identified two CARs that VECTRA did not review. Specifically, CAR Nos. 96.006 and 96.016 that addressed minor issues had not been closed at the time of this inspection. The inspectors noted that the lack of review of these two would not change the audit findings or actions. VECTRA will address these CARs in its 1997 review.

The inspectors also determined that VECTRA failed to comply with required CAR response due dates. Specifically, Paragraph 7.0, "Missed Implementation Deadlines," of VECTRA Procedure No. QP 16-1, "Corrective Action Reports," Revision 1, states in part that "...[i]f no response is received to a CAR within the required time period, the QA Manager shall issue a written overdue notice, typically within 5 working days, to the responsible organization." The inspectors identified numerous instances where CAR responses issued during 1995 and 1996 were late, but the QA Manager did not issue overdue notices to the responsible organizations. However, the inspectors noted that all CARs issued during 1997 were responded to within the required time period.

The inspectors found that VECTRA's review of CARs issued in 1995 and 1996 was satisfactory. Findings identified by VECTRA's QA staff were resolved and the corrective actions were also found to be satisfactory. However, VECTRA issued a total of 73 ARs to identify actions necessary to resolve the remaining restart issues, but at the time of the inspection, VECTRA had completed 55 of the 73 ARs. The inspectors concluded that VECTRA must complete the remaining 18 ARs before resuming full fabrication. This CAI will remain open pending NRC inspection before resuming full fabrication (IFI 72-1004/97-209-08).

CAI 9 - Conduct QA Audit and Technical Review of Historical Review Activities

VECTRA performed audits of historical review activities described in the following corrective action tasks (CATs).

C CAT No. 4: On July 16-20, 1997, VECTRA's QA staff reviewed all NCRs and supplier disposition reports (SDRs) issued in 1995 and 1996 to assess the adequacy of the generic implication (Audit Report No. IPA.0034). As a result, the QA staff identified two findings during the audit (Reference AFR Nos. 97.036 and 97.037).

C CAT No. 5: On April 24-30, 1997, VECTRA's QA staff reviewed all CARs issued in 1995 and 1996 to assess the adequacy of the related corrective action plans

(Audit Report No. IPA.0031). As a result, the QA staff identified four findings (Reference AFR Nos. 97.004 through 97.007).

C CAT No. 6: On July 12-20, 1997, VECTRA's QA staff reviewed all Engineering Change Notices (ECNs) issued in 1995 and 1996 to assess the adequacy of the generic implication and licensing compliance (Audit Report No. IPA.0033). As a result, the QA staff identified three findings (Reference AFR Nos. 97.029, 97.030, and 97.038).

C CAT Nos. 7 and 8: On July 7-17, 1997, VECTRA's QA staff reviewed documents related to the dry shielded canisters (DSCs) and horizontal storage modules (HSMs) to verify that the fabricated products comply with the licensing requirements (Audit Report No. IPA.0032). As a result, the QA staff identified five findings (Reference AFR Nos. 97.031 through 97.035).

C CAT No. 44: On July 22-28, 2997, VECTRA's QA staff reviewed all Safety Evaluations (SEs) and Safety Review Screenings (SRSs) to verify compliance with the company's Certificate of Compliance (COC) (Audit Report No. IPA.0036). As a result, the QA staff identified three findings (Reference AFR Nos. 97.040 through 97.042).

The inspectors reviewed the audits performed by VECTRA's QA staff and found that the auditors developed successful audit plans, audit personnel were trained and qualified, and the audits were comprehensive. In addition, the inspectors found that VECTRA issued AFRs to compel responsible personnel to take the necessary corrective action, and the QA staff tracked the timely completion of those corrective actions. As a result, this CAI is closed.

CAI 13 - Vendor Oversight

At the time of this inspection, the organizational structure of VECTRA's QA staff was being revised to place increased emphasis on supplier oversight activities. Specifically, supplemental QA staff will be added to achieve 100 percent VECTRA vendor oversight for Category A and B items (referenced in NUREG/CR 6407, "Classification of Transportation Packaging and Dry Spent Fuel Storage System Components According to Importance to Safety"). VECTRA is also planning in-process inspections and surveillance of suppliers, consistent with the level of confidence that VECTRA has in each supplier's QA program. The inspectors interviewed VECTRA management personnel regarding staffing requirements in the quality assurance and quality control organization, and reviewed VECTRA's QA Staffing Plan dated September 29, 1997. As a result, the inspectors determined that VECTRA has an adequate plan to perform inspections and surveillance of vendor services. However, the inspectors noted that VECTRA's emphasis on providing effective vendor oversight, will require the presence of a sufficient number of trained personnel at suppliers' facilities during the fabrication process. This CAI will remain open pending NRC inspection before resuming full fabrication (IFI 72-1004/97-209-09).

CAI 16 - Establish an Audit Schedule to Baseline VECTRA's Internal Performance

VECTRA committed to establish a QA audit schedule to provide a baseline for internal performance relative to the company's quality procedures. The results of these audits will provide a basis for comparison with future audits by VECTRA and its customers, as well as inspections by the NRC.

On October 14, 1997, VECTRA issued its "Vendor Baseline Surveillance Plan," Revision 1, which identifies the vendors subject to surveillance and provides guidelines for performing vendor surveillance. VECTRA has performed portions of the baseline surveillance with selected vendors. However, VECTRA has not yet finalized the surveillance checklists and has not established the dates for performing the required surveillance.

In addition, at the time of the inspection, VECTRA had not yet performed all required audits in accordance with QP 18-2, "Audits, Surveillance, and Surveys," Revision 3, dated September 30, 1997. In particular, Section 4.2 of that procedure includes the following requirement:

> Internal management audits are performed to . . .
>
> (1) Verify effectiveness of VECTRA QA functions, and
> (2) Verify service organization compliance with VECTRA's QA Program.
>
> At a minimum, the [Director, Corporate Quality Assurance] DCQA shall plan, schedule, and conduct an annual Corporate QA audit of each VECTRA service organization. The DCQA may authorize in writing an extension of these audits into the first quarter of the following year. These audits shall be conducted in accordance with this QP. See, QP 2-8, "*QA Program Management Review,*" for additional requirements.

In particular, Paragraph 3.0 of QP 2-8, "QA Program Management Review," Revision 1, July 1, 1996, includes the following clarification:

> The QA Program management review consists of the following major elements:
>
> C annual Corporate QA audits of VECTRA operating organizations
> C semi-annual report on the status of VECTRA's QA Program
> C semi-annual review by the VECTRA President
> C annual review by the VECTRA Board of Directors

At the time of this inspection, VECTRA had not yet performed the required audits for 1997, had not developed its audit plans for the internal and management audits, and had not identified the independent organization(s) to perform the management audits. This item will remain open pending NRC inspection of the above mentioned management audits, before resuming limited fabrication (IFI 72-1004/97-209-10).

Nonetheless, the inspectors confirmed that VECTRA has performed the following audits regarding its response to the Demand:

C VECTRA QA performed an audit to confirm completion of and compliance with various commitments in the Demand corrective action plan. VECTRA also established a Fabrication Restart Plan (FRP) that included 22 additional programmatic tasks not specified in the Demand response. In addition, product-specific tasks required to restart fabrication for the Toledo Edison NUHOMS project. In addition, VECTRA's audit included reviewing those tasks in the FRP that were required before restarting fabrication, as well as those that VECTRA desired to complete before the NRC inspection.

C VECTRA performed an audit of the 22 FRP tasks in October 1997. During this audit, VECTRA found 10 FRP tasks that were completed. VECTRA also identified 5 FRP tasks that had findings, and 11 FRP tasks that had open items. During this inspection, however, VECTRA provided the inspectors with information showing that all 22 of the FRP tasks were completed.

C VECTRA performed an audit of the 33 Demand fabrication restart tasks in October 1997. VECTRA found 15 Demand fabrication restart tasks that were completed. During that audit, VECTRA also identified six Demand fabrication restart tasks that had relevant findings, and 11 Demand fabrication restart tasks that had open items. During this inspection, however, VECTRA provided the inspectors information showing that only one of the 11 Demand fabrication restart tasks remains open.

The inspectors did not identify any concerns with these audits.

CAI 17 - Baseline Reviews of Horizontal Storage Modules, Dry Shielded Canisters, Casks, and UX-30s Fabrication Vendors

VECTRA performed surveillance of its suppliers' fabrication activities to provide a baseline of supplier performance relative to VECTRA purchase order requirements, and to identify problems and areas of potential nonconformance before the fabrication readiness review. In preparation for those surveillance, VECTRA issued its "Vendor Baseline Surveillance Plan," Revision 1, dated October 14, 1997, which addressed the implementation of VECTRA's Fabrication QA Plans, fabrication readiness reviews, and vendor QA program. During this inspection, the inspectors reviewed VECTRA's Surveillance Reports for High Tech Manufacturing, dated October 28, 1997; Birmingham Steel Corporation, dated October 28, 1997; Hall-Hodges Company, September 25, 1997; and Bayshore Concrete Products, dated October 7, 1997. As a result, the inspectors determined that the surveillance were comprehensive. In addition, the inspectors noted that VECTRA identified findings which resulted in the issuance of AFRs and requested actions (RAs). As a result, this CAI is considered complete.

CAI 19 - Update/Upgrade Inspection Plans, Surveillance Plans, and Checklists

VECTRA committed to perform 100-percent oversight of supplier activities for Category "A" and "B" items (referenced in NUREG/CR-6407). In addition, VECTRA updated its inspection and surveillance plans and checklists to include the necessary oversight requirements.

The Inspectors reviewed Procedure No. QP 10-1, "Fabrication Quality Assurance Plan," Revision 1, dated September 19, 1997. In particular, that document specifies the requirements and procedures for preparing fabrication QA plans to facilitate source inspections, surveillance, and audits of VECTRA suppliers. The inspectors also reviewed Procedure No. QP 10-3, "Source Surveillance, "Revision 1, dated September 19, 1997, which establishes the methods for planning, performing, and reporting source surveillance activities at suppliers' manufacturing or testing facilities.

Building upon QP 10-1 and QP 10-3, VECTRA developed its "DFI File Documentation for VECTRA Surveillance of DSC Fabrication for Project 2126 (Toledo Edison)." This document provided VECTRA's Fabrication QA Plan, QA Supplier Oversight Policy, Quality Surveillance Plan, and Quality Source Surveillance Checklists. In reviewing these documents, the inspectors determined that the fabrication QA plans and quality source surveillance checklists, completed in the October 1997, are comprehensive. However, this CAI will remain open pending implementation of checklists before limited fabrication resumes (IFI 72-1004/97-209-11).

CAI 29 - Field Observation Training

The CCA identified the need to conduct field observation training for VECTRA's QA staff, project managers, project engineers, component engineers, and selected vendors. In a memorandum, dated April 22, 1997, VECTRA's President required these individuals to attend field observation training conducted by PII. However, as of October 27, 1997, VECTRA identified individuals who had not attended the required training. VECTRA informed the inspectors that these individuals will receive field observation training before limited fabrication. However, as of the time of this inspection, VECTRA had not yet scheduled the required training for these individuals. This CAI will remain open pending NRC inspection before resuming limited fabrication (IFI 72-1004/97-209-12).

CAI 35 - QA Manager Position

VECTRA's CCA identified that the company needed to fill the QA Manager position with an individual who had QA experience related to both the commercial nuclear industry and nuclear utilities, as well as, current knowledge of NRC regulations, and managerial experience in instituting programmatic change. The Inspectors reviewed VECTRA's description of the QA Manager's position, dated October 19977, and found that it identifies the managerial skills, but does not address the requirement for QA experience related to commercial nuclear industry. This CAI will remain open pending VECTRA's revision of the QA Manager's position description before limited fabrication resumes (IFI 72-1004/97-209-13).

CAI 43 - Reinspection of HSM Components of Not in Service

After reviewing nonconformance, audits, and fabrication practices, VECTRA has concluded that HSMs and DSCs that are complete, but not in service, will be reinspected before the components are placed in service. VECTRA informed the inspectors that it plans to develop revised checklists for use in visual inspection of accessible welds and key attributes in the HSMs and DSCs that are identified as fabrication restart items.

As of the time of this inspection, VECTRA has developed the revised checklists concerning the HSMs and DSCs for the Toledo Edison's Davis-Besse project and is developing similar checklists for the Duke Power project. Nonetheless, this CAI will remain open pending NRC inspection before full fabrication resumes (IFI 72-1004/97-209-14).

c. Conclusions

The inspectors concluded that VECTRA has not yet completed its implementation of the necessary elements of its QA program. Of concern was that VECTRA had not performed its annual and semi-annual management reviews of the QA Program, as required by QP 2-8, Paragraph 3.0.

In addition, VECTRA has not yet completed other commitments discussed in the company's response to the Demand. Specifically, the inspectors found that VECTRA has not completed the necessary field observation training and has not taken the necessary action to perform periodic assessments or to improve the measurability of existing performance standards for the QA program. Furthermore, VECTRA has not taken the necessary steps to update the QA Manager Position Description to ensure proper selection of a permanent QA manager.

5.0 DESIGN AND CONFIGURATION CONTROL PROGRAMS

5.1 Control Corrective Action items

a. Inspection Scope (35744)

The inspectors reviewed VECTRA's design and configuration programs, as well as process changes implemented as part of VECTRA's corrective actions in response to the Demand. In particular, the inspectors evaluated VECTRA's changes to alleviate past failures, enhance the QA program, and implement effective procedures to control the design and ensure the company's readiness to resume fabrication. As part of this assessment, the inspectors reviewed nonconformance reports (NCRs), supplier disposition report (SDRs), engineering change notices (ECNs), and corrective action reports to assess that completeness, as well as their adequacy to resolve as identified engineering issues. The inspectors also examined calculations, reviewed documents, and interviewed VECTRA's management and staff to assess the adequacy of the actions related to these items. CAIs related to VECTRA's design and configuration control programs included items 4, 6, 10, and 15, as follows..

b. Observations and Findings

CAI 4 - Generic Impact Review of Non-conformance Reports and Supplier Reports

VECTRA's Engineering Department reviewed a total of 48 NCRs dating back to 1989, as well as 48 SDRs dating back to 1995, and documented their findings in Corrective Action Report 97.007.03, Revision 0, dated March 1997. In particular, the review considered the: (1) generic impact on other projects; (2) compliance with licensing requirements; (3) acceptability of technical resolutions; (4) adequacy of root cause and corrective action evaluation; and (5) whether additional action was required.

VECTRA's QA staff then reviewed CAR.97.007.03, Revision 0, and documented its findings in CAR.97.007-05, Revision 1, dated May 5, 1997. In that report, the QA staff identified 3 new CARs and 31 new RAs. Specifically, the QA staff issued a new CAR containing RAs for NCRs or SDRs that were closed with outstanding actions stilling pending, as well as RAs to track NCRs or SDRs that were still open. The QA staff then forwarded the new CARs and RAs to the Engineering Department by memorandum dated August 4, 1997.

During this inspection, the inspectors reviewed NCR's 89-001, 90-004, 94-001, 94-005, 96-019, 96-020, and 96-026, in order to assess the adequacy of VECTRA's resolution of the issues. The inspectors also reviewed NCRs not yet not completed to assess whether work currently in progress is consistent with the requirements of QPFS 15-1.1, "Non-conformance Reporting."

Overall, the inspectors agreed with VECTRA's resolution of the seven NCRs reviewed as part of this inspection. The inspectors also noted that VECTRA adequately performed the review of historical NCRs and SDRs as required by CAI 4. VECTRA also identified NCRs and SDRs that were not initially appropriately dispositioned and, as necessary, initiated CARs and RAs to document and track the resolution of those items. However, VECTRA still needs to complete several of new RAs that are associated with design parameters before limited fabrication may resume. As a result, this CAI will remain open (IFI 72-1004/97-209-15).

CAI 6 - Generic Impact Review of Engineering Change Notices

VECTRA reviewed a series of ECNs issued since June 1995, to determine if they had a generic impact on other projects. This review was prepared, evaluated, and approved by individuals within VECTRA's Engineering Department, as documented in CAR.97.007-15, Revision 2, dated October 16, 1997. Specifically, Engineering evaluated each ECN to determine whether it was applicable to each project and whether the necessary action had been completed. If not, Engineering documented and tracked the action using the required action list (RAL).

During this inspection, the inspectors reviewed a random sample of ECNs to assess if they had been appropriately reevaluated for generic implications in accordance with Section 6.3 of QPFS 3-6.4, "Engineering Change Notices." As a result, the inspectors

noted that ECNs 96-052, 96-145, 96-179, 96-261, 96-262, 96-264, 96-265, and 97-0410 all had generic implications. The first three of these ECNs had been completed and were considered closed. However, the remaining five required additional actions that VECTRA needs to complete before resuming fabrication.

On the basis of its inspection, the Inspectors concluded that VECTRA had completed the review of ECNs, dating back to June 1995, as required by CAI 6. The inspectors further concluded that the reviews meet the requirements of QPFS 3-6.4. However, VECTRA has not yet completed all of the RAs associated with several of the ECNs. As a result, this item will remain open pending completion of the ECN generic impact review before resuming limited fabrication (IFI 72-1004/97-209-16).

CAI 10 - Improve NCR and Corrective Action Report

VECTRA revised its NCR and corrective action procedures to improve the process for evaluating generic implications associated with nonconformances and performing root cause evaluations to prevent recurrence. During this inspection, the inspectors reviewed the following procedures to assess whether they addressed the aforementioned attributes. The VECTRA procedures reviewed included:

C QPFS 15-1.2, "Non-conformance Reporting," Revision 3, September 19, 1997

C QPFS 16-1.1, "Corrective Action Reports," Revision 2, September 19, 1997

C QP 15-1, "Nonconformances", Revision 2, September 19, 1997

C QP 16-1, "Corrective Action Reports," Revision 1, September 19, 1997

As a result, the inspectors noted that these procedures complement one another, and in general, the QPFS, augment the related QPs. Specifically, the inspectors verified that Section 4.4 of QPFS 15-1.2 addressed the generic impact evaluation, while Section 2.2 addressed use of a CAR to handle recurring NCRs or significant deficiencies, and Section 3.4 identified responsibilities for reviewing probable cause evaluations and actions to prevent recurrence. Similarly, in QPFS 16-1.1, Sections 5.4 and 10.0 addressed the generic impact evaluation, root cause evaluations, and actions to prevent recurrence. The inspectors also found that VECTRA had implemented adequate procedures to facilitate the review of generic implications associated with future NCRs.

In addition, the inspectors noted that the procedure to provide guidance for performing root cause evaluations had not been approved. VECTRA’s staff had received multiple training sessions regarding root cause and common cause assessment (in May 1997. Nonetheless, the inspectors were concerned that, in the absence of a formal procedure, the thoroughness of the evaluations may vary. This item will remain open pending VECTRA's issuance of guidance for performing root cause evaluations before limited fabrication resumes (IFI 72-1004/97-209-17).

CAI 15 - Elimination of Verbal Approvals in the NCR and SDR Procedures

VECTRA revised the following NCR and SDR procedures to eliminate the provision for verbal approvals:

C QPFS 15-1.2, "Non-conformance Reporting," Revision 3, September 19, 1997

C QPFS 15-1.1, "Supplier Disposition Requests," Revision 2, September 19, 1997

C QP 15-1, "Nonconformances," Revision 2, September 19, 1997

During this inspection, the inspectors reviewed documents and interviewed VECTRA's management and staff to assess the adequacy of the changes and their implementation. As a result, the inspectors noted that VECTRA had revised these procedures to eliminate the provision regarding verbal approvals. However, the inspectors noted that the revised procedures did not explicitly prohibit the use of verbal approvals, and did explicitly state that written approval is the only acceptable approval method. The inspectors concluded that VECTRA should clearly rewrite the procedures to prevent future instances in which individuals verbally approve NCRs and SDRs. VECTRA agreed that the procedure will be rewritten before full fabrication resumes. This item will remain open pending the revision of the appropriate procedures before limited fabrication resumes (IFI 72-1004/97-209-18).

c. Conclusions

The inspectors concluded that VECTRA has adequately reevaluated its ECNs, NCRs, and SDRs dating back to June 1995. The inspectors further concluded that, when appropriate, VECTRA had identified and effectively dispositioned generic issues. In addition, the CAR procedure and staff training adequately captured the generic impact evaluations, root cause evaluations, and actions to prevent recurrence,. However, VECTRA had not yet completed all of the RAs that resulted from the reevaluations. In addition, VECTRA had not adequately revised its procedures to prevent recurrence of problems associated with verbally approving NCRs and SDRs. VECTRA needs to resolve these issues before resuming fabrication.

5.2 Open Engineering Items from Previous NRC Inspections

a. Inspection Scope

The inspectors reviewed the actions taken to date to resolve technical issues associated with the DSC calculations, as well as the HSM heat shield paint and concrete aggregate. As part of this review, inspectors examined VECTRA's calculations and documents, and interviewed the company's management and staff to assess the adequacy of the actions to resolve these issues.

DSC Calculations

On March 27, 1997, GPU Nuclear, a utility preparing to use the NUHOMS system, completed an audit which identified that VECTRA's DSC Calculation NUH.004.0202, Revision 0, dated May 1992, did not adequately address the reduction in cross-sectional area of the spacer disc for the 52B basket resulting from the increased spacer slot depth. This discrepancy was originally identified during VECTRA's review of Ranor fabrication drawings, but was improperly evaluated in SRS 95-97, dated October 5, 1995. Specifically, that SRS originally concluded that the discrepancy had no impact on the design basis for the NUHOMS system. In evaluating the recent GPU audit report VECTRA Engineering staff determined that the spacer slots provided for the poison plates were not properly considered in the structural analysis model used for the spacer disk. Specifically, Memo WB-97-042 from Engineering to QA dated June 12, 1997, noted that the top spacer disk for the 52B basket, as shown in the Consolidated Safety Analysis Report (CSAR), did not meet the stress limits for the vertical drop accident, as defined in the Boiler and Pressure Vessel Code promulgated by the American Society of Mechanical Engineers (ASME). During interviews with the inspectors, VECTRA's Vice President of Engineering indicated that although these issues were still being evaluated, the most likely corrective action would be to modify the top spacer disk for the 52B basket.

In response to the identification of the problem with the spacer disc, VECTRA performed a complete review of all DSC calculations, which identified other DSC-related issues. At the time of this inspection, VECTRA was still evaluating the following issues:

C support rod buckling evaluation associated with the accident drop loading of 75g.

C blowdown and reflood pressure evaluation

C modeling of the 24P spacer disks

All of these issues were documented in CAR.97.063 and were being tracked by RAs 97-1610 through 97-1618. At the time of this inspection, VECTRA had completed an evaluation and determined that the 52B spacer disk issue, the blowdown and reflood pressure issue, and the support rod buckling issues were not reportable under per 10 CFR Part 21. VECTRA was in the process of performing a similar evaluation for the 24P spacer disk issue.

The inspectors considered the issues identified by VECTRA and GPU, significant in that they may affect the design and licensing bases of the NUHOMS. Therefore, this item will be tracked as an unresolved item (URI 72-1004/97-209-19).

HSM Heat Shield Paint

NRC Inspection Report 72-1004/96-207 identified concerns regarding the application of paint used on the HSM heat shields. Specifically, the function of the heat shields is to reflect heat and reduce the temperature of the HSM concrete and fuel cladding. The

paint (Carboline Phenoline 305), was certified to 250 degrees F, but the design calculation stated that temperatures could reach 265 degrees F, thereby resulting in paint discoloration. As a result, the inspectors raised the following issues in previous inspection reports regarding this matter:

C The analysis performed for the Rancho Seco project did not clearly evaluate the generic implications of this issue for other projects.

C VECTRA did not identify any root cause or corrective action to prevent recurrence.

C The analysis did not assess paint performance under accident conditions (i.e., 125 degrees F for ambient air with vents blocked for 40 hours).

C The analysis did not consider the effect of discoloration of the replacement paint, Carboline 890, on the heat shield's design-basis ability to radiate heat.

In response to these issues, VECTRA performed various calculations (i.e., NUH004.0421, Revision 1; NUH004.0423, Revision 0; and NUH004.0424, Revision 0) to evaluate the temperature effects on the fuel cladding, DSC components , and HSM concrete under normal, off-normal, and accident conditions. The inspectors reviewed these calculations and determined that VECTRA had demonstrated that all license conditions for past and active projects are satisfied for painted, unpainted, or degraded paint conditions. The inspectors also concluded that VECTRA adequately evaluated the concern in NRC Inspection Report 72-1004/96-207 and this issue is considered closed.

HSM Concrete Aggregate

The NRC Safety Evaluation Report (SER) for the NUHOMS systems general license contained a requirement for thermal expansion testing of aggregates. The first set of general license HSMs were manufactured in California for the Davis Besse and Rancho Seco projects. The aggregates for these HSMs were tested and shown to be compliant with the SER.

For the Oyster Creek project however, VECTRA switched fabricators of the HSM. During fabrication of the Oyster Creek HSMs, a nonconformance identified that the fabrication used an aggregate, (quartz fine), that was not in the approved list of aggregates contained in the SER, and its thermal expansion testing proved to be inconclusive. VECTRA dispositioned the NCR to use-as-is on the basis of administratively limiting the decay heat to approximately 40 percent of the general license requirement. In a subsequent inspection, the NRC questioned the practice of administratively limiting the decay heat and stated that a licensing amendment would be the more appropriate regulatory vehicle.

The SER also permits use of fine quartz aggregate if the concrete temperatures could be shown not to exceed 200 degrees F for normal conditions or 225 degrees F for off-normal conditions. VECTRA therefore revised Calculation NUH004.0421 (Revision 2) to demonstrate acceptable concrete temperatures for removing the heat shield paint and utilizing a galvanized heat shield. Additionally, the NRC inspectors confirmed that NCR-97-0001 (approved on March 6, 1997), documents the configuration change for the Oyster Creek HSMs. Similarly, VECTRA opened CAR-97-008 to evaluate the generic impact of this issue on other projects, as well as its root cause and actions to prevent recurrence. This CAR remains open pending revision to the project-specific purchase orders and fabrication specifications to require that the aggregate qualification must be completed and documented, and the acceptance method must be accepted by the utility client before the aggregate may be used. RA-97-1280 is tracking this action and has identified it as a Priority 1 restart item. The inspectors concluded that VECTRA has adequately resolved all technical issues, and this item is considered closed.

c. Conclusions

The inspectors concluded that VECTRA has adequately reevaluated ECNs, NCRs, and SDRs with regard to the technical issues associated with the HSM heat shield paint concrete aggregate. However, the inspectors also concluded that issues involving potential deficiencies of DSC design calculations are significant and may affect the design and licensing bases of the NUHOMS storage system. As a result, it is apparent to the inspectors that VECTRA is not ready to resume any fabrication-related activities, since many aspects of the design are not finished (e.g., DSC calculations, open RA restart items for NCRs, CARs, and ECNs). VECTRA must resolve these issues before resuming any fabrication.

6.0 REGULATORY COMPLIANCE PROGRAMS

a. Inspection Scope (60851)

The inspectors reviewed VECTRA's Regulatory Compliance Programs to assess whether the company is taking appropriate actions to correct the problems discussed in the Demand, and still maintaining compliance with NRC requirements. Specifically, VECTRA took actions to ensure that the company's regulatory compliance program was implemented in accordance with 10 CFR Part 72. The inspectors therefore reviewed procedures and other documents, and interviewed VECTRA's management and staff to assess the adequacy of the company's implementation of Demand CAIs 1, 2, 7, 8, 11, 18, 22, 24, 40, 41, and 44.

The inspectors reviewed the following actions:

C VECTRA committed not to lift the stop work order until it completed corrective actions, prioritized as "restart" in its response to the Demand.

- C VECTRA assessed whether the DSC and HSM designs, as described in the COC, SER, and Safety Analysis Report (SAR) were adequately transferred into fabrication documents.

- C VECTRA implemented the RAL to provide a means for tracking action items and commitments resulting from ECNs, NCR, and SRS/SEs.

- C VECTRA established a CARC to provide a more critical review of the adequacy of defined corrective actions.

- C VECTRA established a Safety Review Committee (SRC) to provide oversight of the SRS/SE processes.

- C VECTRA trained its management and staff to perform in-depth in compliance with SRS/SEs, COC No. 1004, Condition 9. In addition, VECTRA implemented the use of a checklist to give its staff a tool to ensure that SEs are accurately and uniformly performed.

- C VECTRA performed a historical review of all SRS/SEs initiated from June 1995 through the present.

b. Observations and Findings

CAI 1 - Communicate NRC Meeting Results to VECTRA Staff

The inspectors, confirmed through interviews of VECTRA's management that the company had conveyed to its staff the concerns raised at November 26, 1997, meeting with the NRC. The key issues emphasized were the company's responsibility to maintain strict compliance with the conditions of the Certificate of Compliance and increased attention in the areas of root cause assessments, design configuration control and implementation of the corrective action program. In addition, an all employee meeting was held on March 21, 1997, to communicate and discuss the results of the independent common cause assessment (CAA). By conducting several all employee meetings to discuss the NRC concerns and CAA findings, this CAI is closed.

CAI 2 - Issue Fabrication Stop Work

The inspectors confirmed that VECTRA, issued a letter, dated January 27, 1997, to notify the five subcontractors fabricating components of the NUHOMS system (Bayshore Concrete Products Corporation, Precision Components Corporation, RANOR, Inc., Hi-TECH Manufacturing Company and ACCUTECH) to stop all work being performed for VECTRA. The letter specified that VECTRA had imposed a “stop work” order on all projects, including any completed items to be shipped, until further written notification from VECTRA. At the conclusion of the inspection, the work stoppage was still in place for all subcontractors. In VECTRA's response to the Demand, the company committed to perform a surveillance of each fabricator to verify that adequate controls are in place to resume fabrication activities. The NRC will assess the effectiveness of the surveillances

during a subsequent inspection before limited fabrication resumes (IFI 72-1004/97-209-20).

CAIs 7 and 8 - DSC HSM License Compliance Reviews From License (CSAR, COC, SER) Through Fabrication Documents

The inspectors reviewed portions of VECTRA's process which determined whether the DSC and HSM designs, as described in the COC, CSAR and SER, were adequately transferred into fabrication documents. Specifically, the inspectors reviewed the following documents:

C Report No. CAR.97.007-06, "License Commitments (NUHOMS CSAR, Revision 4A) for Fabrications of DSCs and HSMs," Revision 1, October 1997

C Report No. CAR.97.007-08, "Review of PWR CSAR Drawings vs. PWR General License Fabrication Drawings," Revision 1, October 1997

C Report No. CAR. 97.007-09, "Review of BWR General License Fabrication Drawings vs. BWR Project-Specific (PP&L) Fabrication Drawings," Revision 1, October 1997

C Report No. CAR.97.007-16, "Review of License Commitments -- DSC," Revision 1, October 1997

C Report No. CAR.97.007-20, "Review of BWR Drawings PP&L Project-Specific Fabrication Drawings vs. RANOR Drawings (AR/VR)," Revision 1, October 1997

The inspectors observed that all of the reports used the same methodology to trace the license commitments contained in the COC, CSAR, and SER to the final fabrication documentation. This methodology consisted of two individuals (from the Licensing, Engineering, and Projects organizations) performing independent reviews to identify all commitments contained in the affected documents and note any potential discrepancies. A minimum of one senior manager was involved in each of the reviews. Once both individuals completed their reviews, they compared their results and resolved and documented the differences.

The potential discrepancies were then evaluated through VECTRA's ECN process, and the changes received SRSs in accordance with QPFS 3-6.3, "Certified Storage Systems (10 CFR 72, Subpart L) General License Design Changes," Revision 3. Several discrepancies required full SEs in accordance with Condition 9, of COC No. 1004. These SEs, also performed in accordance with QPFS 3-6.3, did not identify any unresolved safety questions.

The inspectors also reviewed ECNs 96-031 and 96-403, which evaluated some of the discrepancies, to assess the adequacy of VECTRA's SRSs and SEs, and the inspectors agreed with VECTRA's conclusions. In addition, the inspectors interviewed the Licensing Manager and Licensing Engineer, and reviewed QPFS 3.6-1, "Certified Storage System General Licensing," to assess VECTRA's process for updating and maintaining the CSAR. The inspectors did not identify any concerns with that process.

Finally, the inspectors observed that the method used by VECTRA to trace license requirements from the COC, CSAR, and SER was adequate to accomplish the intent of CAIs 7 and 8. The inspectors also observed that, for the discrepancies reviewed by the NRC, VECTRA had adequately dispositioned the discrepancies in accordance with Condition 9 of COC No. 1004, and appropriately updated the CSAR. Inspection of this CAI is closed.

CAI 11 - Proceduralize and Implement the Required Action List Track Internal and External Commitments to Closure

The inspectors reviewed QPFS 2.10-1, "Required Action," Revision 0, dated April 25, 1997, as well as, VECTRA's database of open and closed RAs. In addition, the inspectors interviewed VECTRA's Vice President, Engineering and Mechanical Engineering Lead to obtain a working understanding of the RAL and assess whether it is implemented in accordance with CAI 11.

The inspectors noted the following positive observations:

C Any VECTRA employee may initiate an RA. While this may lead to redundancies in the RAL, it provides greater opportunity to detect and address an issue. It is the responsibility of the assigned RA Managers (one manager each for the Licensing, Project, Engineering, QA, and Corporate organizations) to identify and close out redundant items to prevent duplication of effort.

C All VECTRA employees interviewed understand and use the RAL to track their assignments and projects.

The inspectors noted also the following negative findings:

C Not all of the scheduling features of the RAL (such as "estimated task hours" and "estimated completion date") were consistently used.

C Some items, which exceeded both their priority completion date and estimated completion dates, were still open. However, VECTRA had not updated these items to reflect a new completion target date and had not provided any justification in the status or comments sections of the RAL.

C To identify all RAs required to be completed before beginning fabrication of a specific project, the project manager would have to perform several database searches. However, none of the procedures provided formal guidance to assist the project manager in ensuring that all RAs were closed, if required. This was a concern to the inspectors because, at the time of the inspection, approximately 600 RAs were open.

The inspectors observed that the RAL, as implemented, met the intended corrective actions of CAI 11. However, the inspectors noted that VECTRA's management should continue to follow the implementation of the RAL, once fabrication activities associated

with the NUHOMS system have resumed, to ensure that it becomes fully implemented and the backlog does not become unmanageable. Inspection of this CAI is closed

CAI 18 - Establish Corrective Action Review Committee Chaired by QA Manager to Review and Approve Corrective Actions from CARs & AFRs

The inspectors were concerned that the implementation of the CARC may not meet the intent of CAI 18. The inspections raised this concern in light of the following findings:

C The inspectors reviewed the minutes from CARC Meeting 12 (October 14, 1997) and Meeting 13 (October 15, 16 and 17) and determined that 36 of the 48 CARs annotated as ?CARC review complete," still had open required actions. In some cases, the CARC added new required actions that had to be completed before the CAR was closed. The inspectors also noted that QPFS 16-1.1, "Corrective Action Reports," Revision 2, is not clear with regard to the responsibilities of the CARC. Specifically, Section 10 of the procedure requires that the CARC review the CAR for adequacy, but does not state when the review is to be performed. However, Section 10 is not clear when the review should be performed. The inspectors questioned whether the CARC review was performed before or after the verification by the QA Manager that a CAR has been completed.

The inspectors discussed this issue with the QA Manager and the Manager of Programs and Audits, who stated that it was the intent of CAI 18 and QPFS 16.1-1 to perform an in-process review of the CAR to ensure that analyses and root cause evaluations were on "the right track." The managers discussed with the inspectors the use of a supplemental checklist by the CARC, indicating that the CARC review was meant to be an ?in-process" step. The managers stated that the checklist was omitted from QPFS 16.1-1 to give the CARC flexibility during CAR reviews. The inspectors noted that the use of the supplemental checklist included in QPFS 16-1.1 would ensure the CARC does not change commitments in CAI 18 without the concurrence of senior VECTRA management.

C During the review of QPFS 16-1.1, the inspectors identified that the QA Manager conducts the final review to verify that a CAR has been completed. The inspector noted that the DCQA and QA Manager functions are being performed by the same person. The inspectors concluded that, while the DCQA could perform indepen-dent audits of operating organizations such as Licensing and Engineering, the DCQA could not perform an audit of the QA Program administered by the QA Manager. Therefore, the inspectors further concluded that an independent audit of the QA Manager functions could not be performed as required by QP 2-8.

Overall, the inspectors found that VECTRA has sufficiently implemented QPFS 16-1.1 to address the corrective actions of CAI 18. However, the inspectors determined that all supplemental checklists used by the CARC should be included in QPFS procedures.

In addition, the inspectors concluded that QP 2-8 is not adequate guidance for conducting an independent audit of the QA Program, as implemented, to verify that the program meets all of the requirements of 10 CFR 72, Subpart G. The inspectors will treat this finding as a URI pending the completion and NRC inspection of the management audit, as discussed for CAI 16 in Section 4.0, above (URI 72-1004/97-209-21b).

CAI - 22 Update Readiness Review Checklist

To formalize fabrication restart readiness reviews of subcontractors, VECTRA implemented Quality Procedure Fuel Services (QPFS) 7-1.1, Revision 1, "Fabrication Readiness Review," dated April 25, 1997. The inspectors made the following observations and findings:

C During interviews with VECTRA's project managers and QA engineers, the inspectors determined that the individuals understand their responsibilities for completing the Fabrication Readiness Review Checklist.

C During the review of QPFS 7-1.1, the inspectors noted that Section 4.2 states that the QA Manager may approve the start of any fabrication without first completing all of the items contained in the Fabrication Readiness Review Checklist. However, interviews with the Manager of Projects and the QA Manager, confirmed that the QA Manager is required to determine if fabrication, by a subcontractor, can commence without completion of the Fabrication Readiness Review Checklist.

10 CFR 72.142(b) requires that persons and organizations performing QA functions shall report to a management level that ensures the required authority and organizational freedom, including sufficient independence from cost and schedule considerations, when these considerations are opposed to safety. The inspectors identified that, by requiring the QA Manager to make determinations regarding whether to begin fabrication of NUHOMS components with checklist items still open, QPFS 7-1.1 could be contrary to 10 CFR 72.142(b), when a safety issue is involved.

The inspectors discussed this finding with the QA Manager and the Manager of Programs and Audits. Both individuals agreed that the QA Manager should not have final approval of the Fabrication Readiness Review Checklist. Both also stated that the QA Manager's involvement in the process would be audited by an independent organization, in accordance with VECTRA's QA Program. However, the inspectors noted that QP 2-8 "QA Program Management Review," Revision 1, Section 4.0, "Corporate QA Audits," includes the following requirement:

> "The DCQA [Director, Corporate Quality Assurance] shall audit each VECTRA operating organization once annually to verify that the organization is complying with requirements of the *VECTRA Quality Assurance Procedures Manual* and *VECTRA Quality Assurance Manual."*

Currently, the DCQA and QA Manager functions are being performed by the same person. The inspectors concluded that while the DCQA could perform independent audits of operating organizations such as Licensing and Engineering, the DCQA could not

perform an audit of the QA Program administered by the QA Manager. Therefore, the inspectors further concluded that the DCQA audit of the QA Manager as performed as by QP 2-8, would not satisfy the requirements of 10 CFR 72.142.

The QA Manager and the Manager of Programs and Audits stated that an audit will be performed, before resuming any fabrication activities, by an organization independent of VECTRA.

The inspectors identified that QP 2-8 is not adequate for an independent audit of the QA Program, as implemented, to verify that the program meets all of the requirements of 10 CFR 72, Subpart G. Therefore, the requirements of 10 CFR Part 72.142 could be compromised in the future. The NRC consider this finding as a URI pending the completion and NRC inspection of the management audit, as discussed for CAI 16 in Section 4, (URI 72-1004/97-209-21a).

CAI 24 - Establish Safety Review Committee for SRS/SE (Revise Procedure)

Section 5.4 of QPFS 3-6.3 implemented the use of an SRC to review approved SRS/SEs deemed to be significant identified by VECTRA, NRC, and SDR process. Specifically, the procedure defines **?**significant" to include a major design change or a completed NCR/SDR with a "use-as-is" or "repair" disposition. The inspectors reviewed the SRC process and reached the following findings:

C Section 5.4 of QPFS 3-6.3 defines significant; however, it does not state who determines if an SRS/SE meets that definition. Therefore, the inspectors could not conclude that the SRC receives all SRS/SEs requiring review.

C CAI 24 and Section 4.7 of QPFS 3-6.3, require that the SRC must consist of the Licensing Manager (Chairman), the Engineering Manager, the Manager of Projects, and the QA Manager, and at least three of these individuals must be present for a committee to quorum. However, 10 CFR 72.142(b) requires that the persons and organizations performing QA functions shall report to a management level that ensures the required authority and organizational freedom (including sufficient independence from cost and schedule considerations) when these considerations are opposed to safety. The inspectors determined that QPFS 3-6.3 requires the QA Manager to make decisions that may affect cost and scheduling and yet may be contrary to safety.

C During a review of the SRC Meeting Minutes dated October 25, 1997, the inspectors determined that the SRC had agreed that SRS/SEs, reviewed during past NRC inspections, did not need to be reviewed during the historical reevaluation described in CAI 44. (Approximately 90 SRS/SEs were involved.) The inspectors considered it inappropriate for the SRC to take credit for NRC inspections to complete corrective actions described in VECTRA's response to the Demand. The inspectors discussed this issue with the relevant managers, who indicated that this concern was also raised by QA during an audit of the

implementation of CAIs. Consistent with the audit finding, on October 28, 1997, the SRC agreed to include all SRS/SEs in the corrective actions for CAI 44.

The inspectors observed that the implementation of the SRC was a positive corrective action; however, it was not adequately implemented. Specifically, the inspectors identified that the SRC was not independent of QA. The inspectors further determined that contrary to 10 CFR 72.142(b), QPFS 3-6.3 requires the QA Manager to make cost and scheduling determinations that may affect safety. QA did not appear to have sufficient independence from cost and schedule considerations. The inspectors considered this finding unresolved item pending the completion and NRC inspection of the management audit, as discussed for CAI 16 in Section 4.0 above (URI 72-1004/97-209-21c).

CAIs 40 and 41 - Institute Condition 9 Checklist as Quality Check for Consistency and Accuracy of Safety Assessments and Train Personnel to Perform In-depth Safety Assessments (Condition 9)

The inspectors reviewed training records and training aids, and interviewed VECTRA's management and staff to assess the adequacy of the company's implementation of the Condition 9 training program. This training included lessons learned during the resolution of past problems with SRS/SEs at VECTRA. The inspectors found that all individuals had received the required training. In addition, the staff and management had a thorough understanding of the SRS/SE process implemented by QPFS 3-6.3.

The inspectors also found that VECTRA had adequately implemented training program and a checklist to enhance SRS/SEs, in accordance with CAIs 40 and 41. Inspection of these CAIs is closed.

CAI 44 - Perform SRS/SE Review for COC Compliance (June 1995 through Present)

The inspectors reviewed Report No. CAR.97.007-30, “Review of Safety Review Screenings (SRS) and Safety Evaluations (SE),” October 1997 and observed that the report clearly describes the review process and documents its findings. The inspectors also reviewed random SRS/SEs, identified in the report, which originally received only an SRS. The inspectors confirmed that, when appropriate, full SEs were performed for issues that had previously only received an SRS. When SRSs that should have received full SEs were identified, they were included in the Condition 9 training. No unresolved safety questions were identified by the subsequent reviews.

The inspectors did not identify any technical concerns regarding the historical reviews of SRS/SEs. However, the corrective actions associated with this CAI have not been completed. Therefore, CAI 44 will remain an inspection follow-up item (IFI) to be reviewed before limited fabrication resumes (IFI 72-1004/97-209-22).

c. Conclusions

With respect to VECTRA's readiness to resume fabrication, in light of the review of corrective actions and the creation of the Safety Review Committee, the inspectors concluded that VECTRA's QA Department does not have sufficient independence from other organizations. As noted above, this issue will be tracked as a URI and will require inspectors followup before full fabrication resumes.

Notwithstanding, the inspectors concluded that all other areas inspected with regard to VECTRA's Regulatory Compliance Program were satisfactory.

7.0 VECTRA'S RESPONSE TO THE NRC'S DEMAND FOR INFORMATION

a. Inspection Scope

VECTRA responded to the Demand on April 10, 1997. On April 29, 1997, NRC requested additional information to clarify the response. On June 5, 1997, VECTRA provided the requested information. As discussed above, the inspectors reviewed VECTRA's response to the Demand and associated corrective actions.

b. Observations and Findings

The inspectors had the following observations for each issue in Section III of the Demand:

- The inspectors confirmed that VECTRA had conducted a comprehensive review of its design control, since June 1995, of the NUHOMS system. VECTRA verified that the specifications have been accurately and clearly translated into the form of drawings, specifications, and purchase orders. If nonconforming conditions were identified, VECTRA took appropriate corrective actions to address generic concerns, perform SEs and preclude repetition of the condition. (Further inspection information on this issue is contained in Sections 5 and 6 of this report.)

- The inspectors confirmed that VECTRA performed a comprehensive review of all design changes and nonconformances initiated since June 1995. As necessary, VECTRA identified generic applicability of issues, performed SEs and implemented corrective actions to preclude repetition of previously unidentified problems (further inspection information on this issue is contained in Section 5 of this inspection report).

- The inspectors confirmed that VECTRA has performed an assessment of its safety culture and QA Program and implemented corrective actions to prohibit recurrence of the problems discussed in the Demand (Further inspection information on this issue is contained in Sections 3, 4, and 6 of this inspection report.)

c. Conclusions

The inspectors concluded that VECTRA has implemented sufficient programs and procedures to adequately resolve all NRC concerns discussed in the Demand.

Therefore, the inspectors further concluded that NRC should not issue Orders as discussed in Section III of the Demand.

With respect to resolution of CAIs, the inspectors concluded that VECTRA has not yet fully implemented all programs, procedures, and corrective actions, necessary to resume fabrication-related activities. Table 1 lists the CAIs that remain open and require NRC inspection followup before VECTRA resumes limited and, subsequently, full fabrication.

8.0 OVERALL INSPECTION RESULTS

As a result of this inspection, the inspection team found that VECTRA had made progress toward completing the corrective actions associated with the Demand. The inspectors concluded that VECTRA has implemented sufficient programs and procedures to adequately resolve all NRC concerns discussed in the Demand. Therefore, the inspectors further concluded that NRC should not issue Orders as discussed in Section III of the Demand. However, the team identified several areas in which VECTRA had either not developed sufficient corrective actions or the corrective actions had not been fully implemented. The status of VECTRA's corrective actions to the Demand are listed in Table 1.

Overall, the inspection found that VECTRA, thus Transnuclear-West, was not ready to resume fabrication.

9.0 EXIT MEETING SUMMARY

The team presented its inspection findings to Transnuclear-West (formerly VECTRA) on December 22, 1997, at a public meeting in Rockville, Maryland. Principle meeting participants are listed in Table 2. NRC Senior Management stated that as a result of the inspection findings, NRC would not issue Orders to Transnuclear-West as described in the Demand. The NRC Senior Management outlined the schedule expectations prior to resuming full fabrication for the NRC and Transnuclear-West. A view graph, Figure 1, presented this information in a time line format. As indicted on the view graph, the NRC staff stated that a NRC inspection would be conducted before commencement of full fabrication.

Transnuclear-West's management acknowledged the inspection team’s findings and affirmed that full fabrication would not occur until the NRC was satisfied that the Demand's corrective actions were complete. The inspectors asked Transnuclear-West whether any materials examined during the inspection should be considered proprietary. No proprietary information was identified.

INSPECTION PROCEDURES USED

IP 35702: Inspection of Quality Verification Function
IP 35744: QA Program (Design Changes and Modifications)
IP 36800: Organization
IP 60851: Design Control of ISFSI Components

LIST OF ACRONYMS

AFR	Audit Finding Report
AR	Action Request
ASME	American Society of Mechanical Engineers
CAI	Corrective Action Items
CAR	Corrective Action Report
CARC	Corrective Action Review Committee
CAT	Corrective Action Task
CAQ	Conditions Adverse to Quality
COC	Certificate of Compliance
CSAR	Consolidated Safety Analysis Report
DCQA	Director Corporative Quality Assurance
DFI	Demand for Information
Demand	Demand for Information
DSC	Dry Shielded Canister
ECN	Engineering Change Notice
FRP	Fabrication Restart Plan
HSM	Horizontal Storage Module
MQI	Management Quality Index
NCR	Non-Conformance Reports
NRC	U.S. Nuclear Regulatory Commission
PII	Performance Improvement International
QA	Quality assurance
QAM	Quality Assurance Manager
QPFS	Quality Procedure Fuel Services
RAC	Requested Actions
RAL	Required Action List
SER	Safety Evaluation Report
SCAQ	Significant Conditions Adverse to Quality
SCI	Safety Culture Index
SDR	Supplier Disposition Report
SE	Safety Evaluation
SRC	Safety Review Committee
SRS	Safety Review Screening
RA	Required Action
VECTRA	VECTRA Technologies, Inc